Executive Summary

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Section 1: Executive Summary

Introduction

One of the most significant environmental agreements in the history of the Great Lakes took place with the signing of the Great Lakes Water Quality Agreement of 1978 (GLWQA), between the United States and Canada. This historic agreement committed the U.S. and Canada (the Parties) to address the water quality issues of the Great Lakes in a coordinated, joint fashion. The purpose of the GLWQA is to "restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem." One of the recommended actions of the GLWQA is the production of Lakewide Management Plans (LaMPs) for the lake waters to identify critical pollutants that impair beneficial uses and to develop recommendations, strategies, and policy options to restore these beneficial uses. LaMPs are also to develop ecosystem objectives for the lakes as the state of knowledge permits. The LaMPs provide a binational structure for addressing environmental and natural resource issues, coordinating research, pooling resources, and making joint commitments to improve the environmental quality of the Great Lakes.

The Lake Erie LaMP process began in 1995 with the publication of the Lake Erie LaMP Concept Paper (U.S. EPA 1995) which provided a framework for building the LaMP. In keeping with the direction of the GLWQA, the framework included an emphasis on public involvement. Throughout the Lake Erie LaMP process and in preparation of LaMP technical reports and documents, the participation and input of the Lake Erie Binational Public Forum has been promoted and encouraged.

Dealing with complex assessments, complicated issues and numerous stakeholders made the LaMP process a resource intensive effort, one that took longer than expected. In the interest of advancing the rehabilitation of the Great Lakes, and getting information to the public in a timely manner, the Binational Executive Committee (BEC) passed a resolution in 1999 to accelerate the effort. Acceleration meant that there should be an emphasis on taking action and adopting a streamlined approach to the LaMP document review and approval process. Steering away from the four-stage process outlined in the GLWQA, BEC recommended a LaMP be prepared every two years based on the current body of knowledge, and state the remedial actions that could be implemented now. The concept of adaptive management will be applied to the LaMP so that it can continue to adjust over time to highlight and address the most pertinent issues in Lake Erie. LaMP 2000 is a working document of the dynamic LaMP process. Some sections and the background reports used to produce them have been extensively reviewed while others have not, but it provides a common baseline against which to measure the progress of Lake Erie beneficial use protection and restoration.

Lake Erie has undergone considerable environmental change over time, being the most highly populated basin of the Great Lakes. The shallow nature of the basin makes it particularly vulnerable to land use changes and loadings. Much of the watershed has been irreversibly changed, and we cannot expect to return to the natural, pristine system of the pre-settlement 1700s. However, protecting the natural lands remaining and restoring the beneficial uses is an achievable goal. For example, the highly polluted conditions of the 1950s to the 1970s were reversed by controlling domestic and industrial discharges to the lake, particularly as related to phosphorus loading. Populations of commercial and sport fish species have been improved by controlling catch rates.

Ecosystem Change

The introduction of non-indigenous invasive species, particularly the zebra mussel, triggered a tremendous ecological change in the lake. The zebra mussel has altered habitat, the food web dynamic, energy transfer and how nutrients and contaminants are cycled within the lake ecosystem. It is important to continue monitoring and research to better understand the lake system so that appropriate management decisions can be made to protect and restore Lake Erie.

Before ecosystem objectives can be established for Lake Erie, a preferred ***ecosystem alternative*** must first be identified. Ecosystem alternatives are qualitative descriptive statements of desired future conditions in the lake. The ecosystem alternatives are the scenarios that can be achieved through management actions that address contaminant loading, phosphorus management, changes in land use, control of exploitation from fish and wildlife harvesting, and the protection and restoration of natural land (undeveloped natural landscapes or habitat).

Using the results of the Lake Erie Systems Model developed by the ecosystem objectives subcommittee, LaMP 2000 presents four potential ecosystem alternatives. The key driver in the exercise that led to the identification of these four alternatives was the availability of natural land. Therefore, the four alternatives are described primarily in relation to that component. Alternative #1 represents moderate gain in the availability of natural land; alternative #2 represents a high gain; alternative #3 represents a low gain; and alternative #4 represents the status quo. Each alternative can be achieved through a variety of management actions, and social and economic values associated with those management actions must be considered as well. Management actions that affect land use practices and nutrient loading will have the greatest impact on the ecosystem.

A consultation process has been initiated to select a preferred ecosystem alternative. It involves discussions and input from the Lake Erie Binational Public Forum, the interested public, the Work Group and the Management Committee. The preferred alternative is expected to be selected by the end of 2000. Once the preferred ecosystem alternative is selected, specific ecosystem objectives and indicators can be developed. The current state of the lake, as identified by the Lake Erie LaMP problem definition stage, will be compared to the ecosystem objectives to identify further management and research needs.

Problem Definition

The largest accomplishment of the Lake Erie LaMP to date has been problem definition, specifically determining the status of beneficial use impairments. Only three beneficial use impairments were concluded not to be found in Lake Erie: tainting of fish and wildlife flavor; restrictions on drinking water; and added costs to agriculture and industry. LaMP 2000 synthesizes the results of the beneficial impairment assessments by linking impairment conclusions, causes and trends. The beneficial use impairments are grouped into three broad categories based on the primary areas of public interest for the synthesis. The categories include: human use impairments, impairments due to chemical contaminants, and ecological impairments. Ongoing research, data gaps and potential emerging issues are listed for the impairments in each category. The causes of impairment to date have been identified as: PCBs, mercury, PAHs, lead, chlordane, dioxins, DDE, DDT, mirex, dieldrin, phosphorus, nitrates, *E.coli*, fecal coliform, non-indigenous invasive species, habitat loss, and sediment loading.

Mercury and PCBs have been designated critical pollutants for priority action by the Lake Erie LaMP. A number of chemicals, metals, nutrients, bacteria and suspended solids have been identified as Lake Erie LaMP pollutants of concern. A review of existing databases containing information on these substances was made to determine their utility for calculating loads or tracking ambient environmental concentrations of pollutants (amounts in fish tissue, sediment and the water column). Data available for some of the nutrients may be usable for calculating loads, but for the most part, LaMP 2000 recommends a source track down approach as opposed to a mass balance approach for reducing contaminant loads to

Lake Erie. Once the most seriously contaminated areas and major sources are identified, the Lake Erie LaMP recommends that resources and remedial actions be focused immediately on those areas rather than spent on further attempts to estimate total loads.

The GLWQA requires that LaMPs define the threat to human health posed by critical pollutants, singly or in synergistic or additive combination with another substance. Several of the beneficial use impairments, such as drinking water impairment, fish consumption advisories and recreational water quality use, directly address human health. However, it was decided that the LaMPs had to go beyond the beneficial use impairment assessments to meet the intended purpose of the language in the GLWQA. Therefore, Lake Erie LaMP 2000 describes pathways of exposure, the weight of evidence approach linking environmental exposure to health effects, and suggests a preliminary suite of indicators to measure human health impacts.

Action Plans for Implementation

One of the primary reasons for accelerating the LaMP process was to support implementation over more planning and document review. LaMP 2000 describes several programs already underway that the Lake Erie LaMP can network with to help restore the lake. These include RAPs, the Great Lakes Fishery Commission, the Great Lakes Binational Toxics Strategy, North American Waterfowl Management Plan, State of the Lakes Ecosystem Conference (SOLEC) and the Lake Erie at the Millenium initiative. The last of these is a binational, coordinated effort to identify the management and research needs of the lake, link them, and obtain the resources to complete the most needed research and monitoring efforts.

For Lake Erie LaMP 2000, action plans were developed for habitat protection and restoration, and PCBs and mercury (Lake Erie LaMP critical pollutants) reduction in the Lake Erie ecosystem. Lake Erie LaMP 2000 proposes a process for developing a comprehensive habitat protection and restoration plan. Preliminary screening criteria were created against which to compare existing and proposed habitat projects to the goals and objectives of the Lake Erie LaMP. Additionally, eight different types of projects were determined to be necessary to adequately address habitat restoration in the Lake Erie basin. Thirty-seven existing and 19 proposed habitat projects are presented in this document, and categorized as to type. These projects represent only a preliminary list and a much more complete list will be included in future LaMP documents.

The action plan for mercury describes many ongoing activities being implemented by many of the LaMP agencies to reduce mercury in the environment through education, proper collection and disposal, pollution prevention and implementation and enforcement of regulatory standards and programs. Many of the actions are tied directly to the Great Lakes Binational Toxics Strategy. The mercury action plan also mentions the development of a U.S. EPA Total Maximum Daily Loads Strategy for mercury for Lake Erie. TMDLs are a requirement of the U.S. Clean Water Act and can be used as a tool to contribute to the restoration of beneficial uses of Lake Erie.

For PCBs, the action plan focuses more on cleanup and removal of PCBs from the ecosystem, particularly in regard to remediation of contaminated sediments. Since the production of PCBs have been banned and most jurisdictions no longer permit their discharge, most existing PCBs are due to legacy sources from past production or disposal practices.

Emerging Issues

In addition to current issues of concern, the Lake Erie LaMP 2000 document presents significant ongoing and emerging issues. The first of these is the problem of non-indigenous invasive species in the lake. They are playing a strong role in influencing the biological populations in the Lake Erie basin, both plant and animal, and both aquatic and terrestrial. Emerging issues include climate change, endocrine disruptors, and the realization that phosphorus management and monitoring must continue while we work to better understand the changing phosphorus cycling in the lake.

Public Outreach

In addition to reviewing LaMP technical reports, the Lake Erie Binational Public Forum has completed a number of projects and activities that are described in the LaMP 2000 document. Public outreach and involvement is a major component of the LaMP process. In addition to the outreach and input from the Forum, the public involvement subcommittee of the LaMP has implemented several outreach and public education efforts, primarily aimed at making LaMP technical information more public friendly. Both the Binational Public Forum and the Lake Erie LaMP Technical Work Group support websites. They can be found at www.erieforum.org and www.epa.gov/glnpo/lakeerie/ or www.cciw.ca/glimr/lakes/erie/, respectively. All final Lake Erie LaMP background documents, organizational information, general information, etc., are available on the Work Group site.

LaMP 2002

The next comprehensive LaMP document will not be published until 2002. However, a number of background reports, in depth technical documents, public updates, issue papers, etc. will be developed. Coordinating with the 20 agencies representing two countries, four states, and a province, as well as with the interested public (including the Lake Erie Binational Public Forum), will lead ultimately to a Lake Erie LaMP that all of the partners can commit to implementing.